

# Assignment 1: FSM D

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## 1 Introduction

A Finite State Machine with Datapath (FSMD) model is a well known method of representing hardware and software design that takes the pathways of a FSM model and gives it data points, or variables. In this assignment, we were tasked with writing a program that would simulate an FSMD model by taking an XML description file and the complimentary and optional XML stimulus environmental file along with the maximum number of cycles the simulation should perform and executes the FSMD. In this report, we will go through the steps to explain how each section of the code works.

## 2 Flow Chart

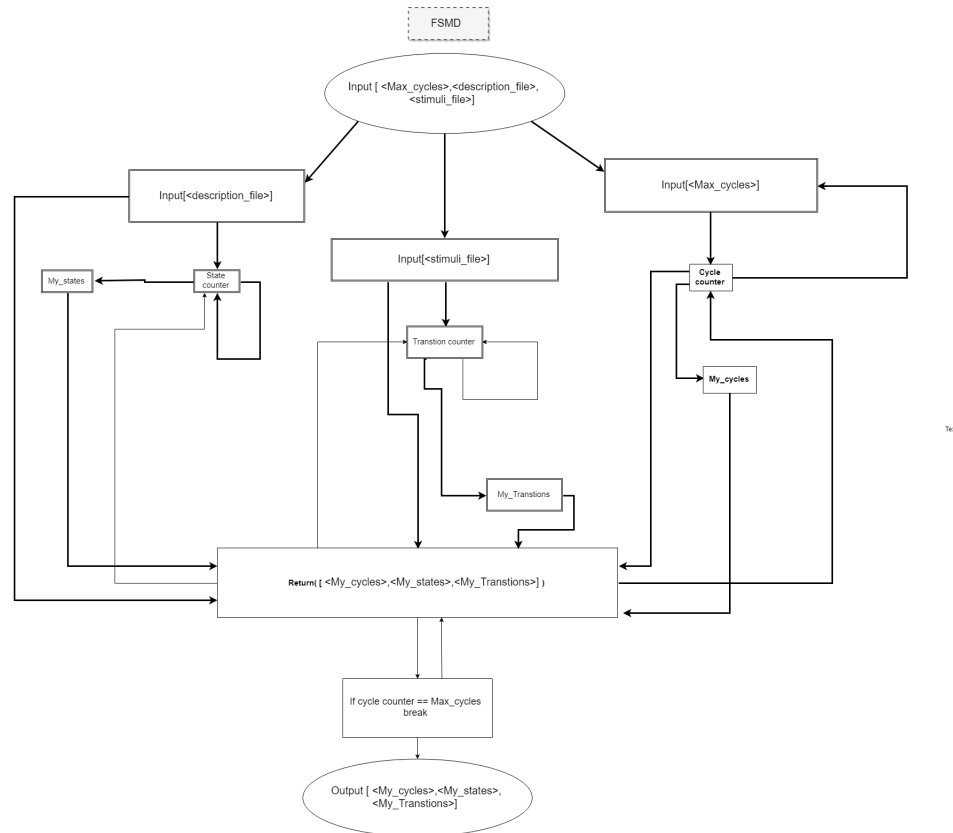


Figure 1: FSMD Model Flow Chart

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This flow chart shows the model for our FSMD simulation. From this chart, you can see we have three inputs, loops that run for each of them fulfilling different conditionals. Each of these loops connect to a return, which, depending on whether the conditional is fulfilled, leads to an output.

### **3 File Input**

To start off with, we have the User Interface at the beginning of our program, which asks the user to input the number of cycles for the program, the description XML file, and the stimulus XML file if necessary. We decided to add a few easter eggs here that would print different statements depending on the user's input and so on.

The max cycles will go into a cycle counter and will return the current number cycle we are on. Once the current cycle is equal to the max cycles we specified, the program will be finished.

Meanwhile, the description XML file is converted into 7 variable lists, labeled states, initial\_state, inputs, variables, operations, conditions, and fsmd. These lists are then evaluated and then merged.

Because the stimulus XML file is optional, we first check to see if there even is one. The stimulus file has a setinput variable which basically limits the cycles of the FSMD.

### **4 Test 3**

### **5 Conclusion**

With our code, we were able to make an FSMD simulator as well as a test file to run in our code. This assignment gave us the ability to see the basic functions of an FSMD model in action, as